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Fighting Spam with a Perimeter Mail System

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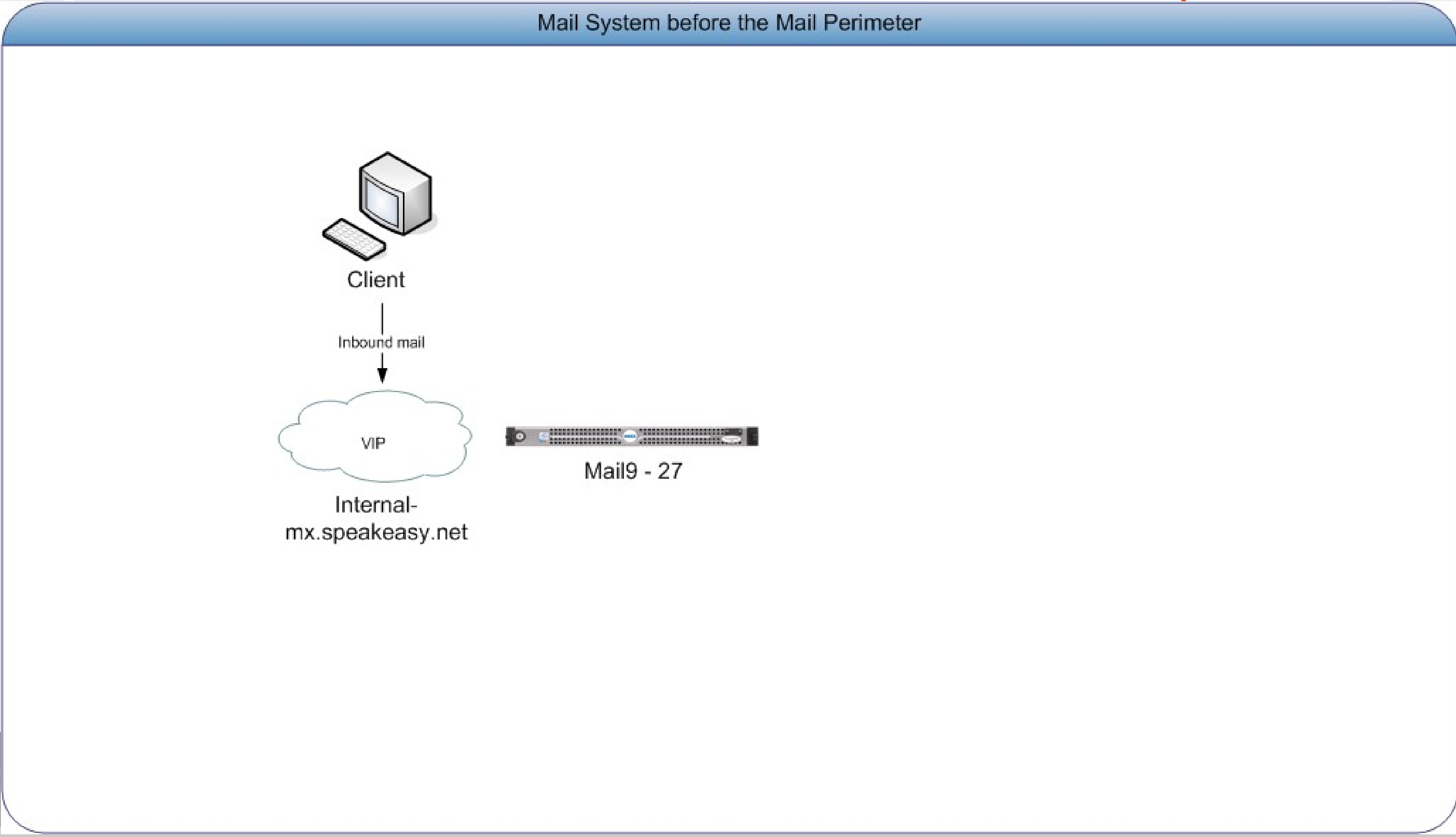
08-Nov-2007 @ SASAG

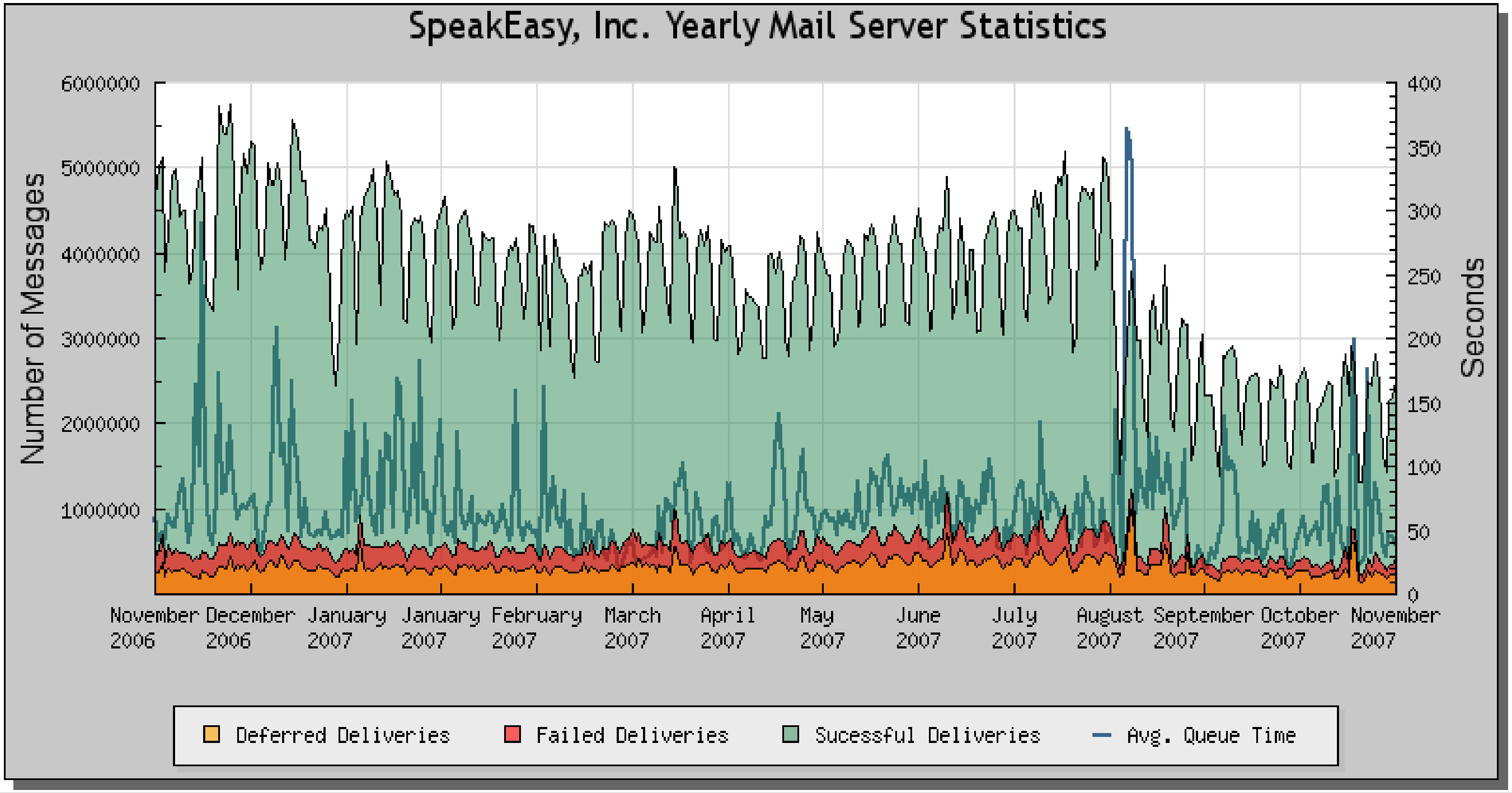
Hello and stuff

- Speakeasy started as the first internet cafe in 1995 and soon became a broadband provider. We currently provide DSL and T1 connectivity nation wide as well as managed services.
- One of our more exciting endeavours is VoIP
- You should probably be working for us

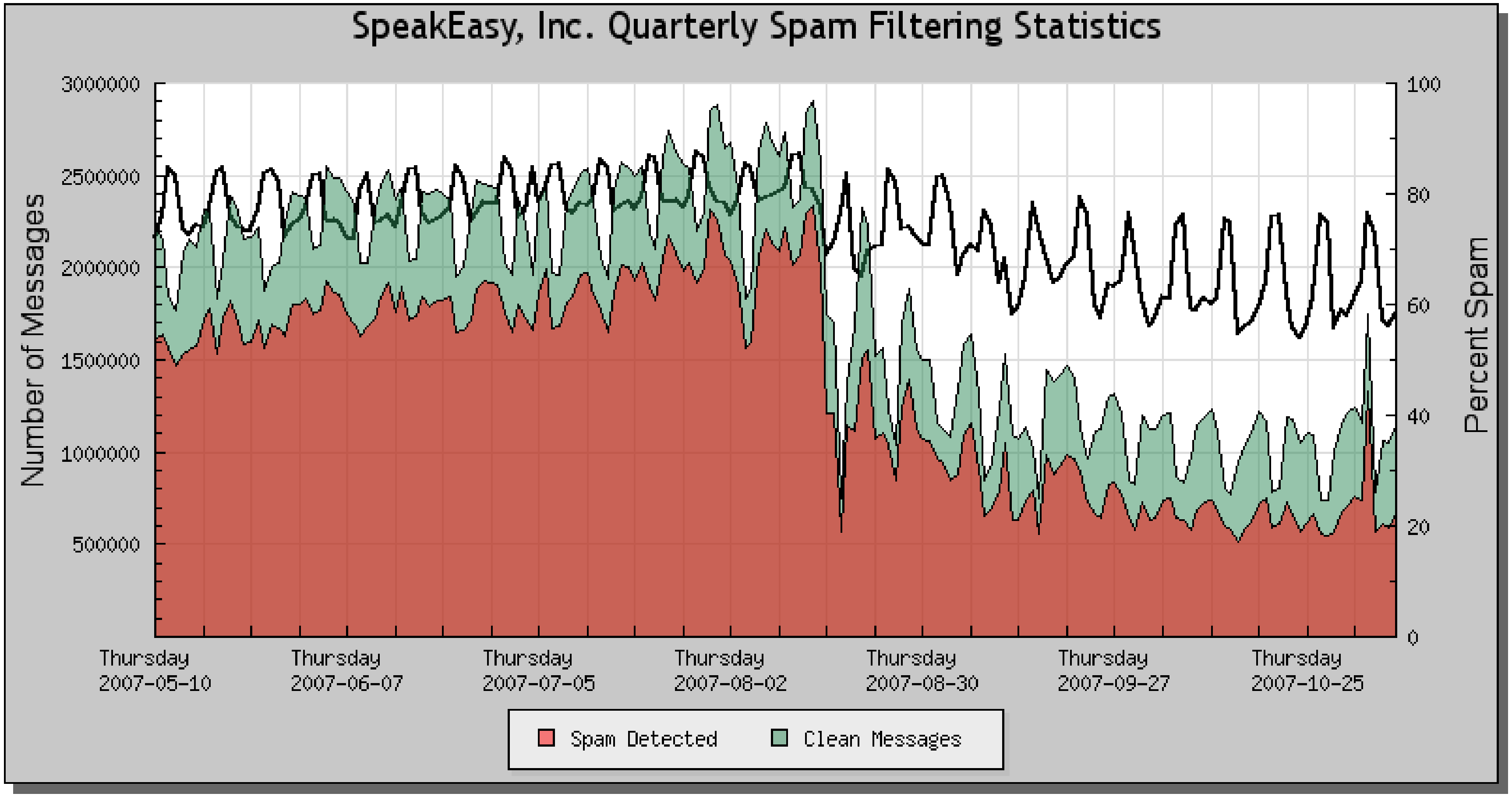
The world before the perimeter


Mail System before the Mail Perimeter
Client
Inbound mail
VIP
Internal-mx.speakeasy.net
Mail9 - 27

The world before the perimeter



The world before the perimeter



Why move to a tiered system?

Lots of pieces to the puzzle – easy to swap the services between hardware

- greylisting
- virus scanning
- spam tagging
- mail delivery / relaying

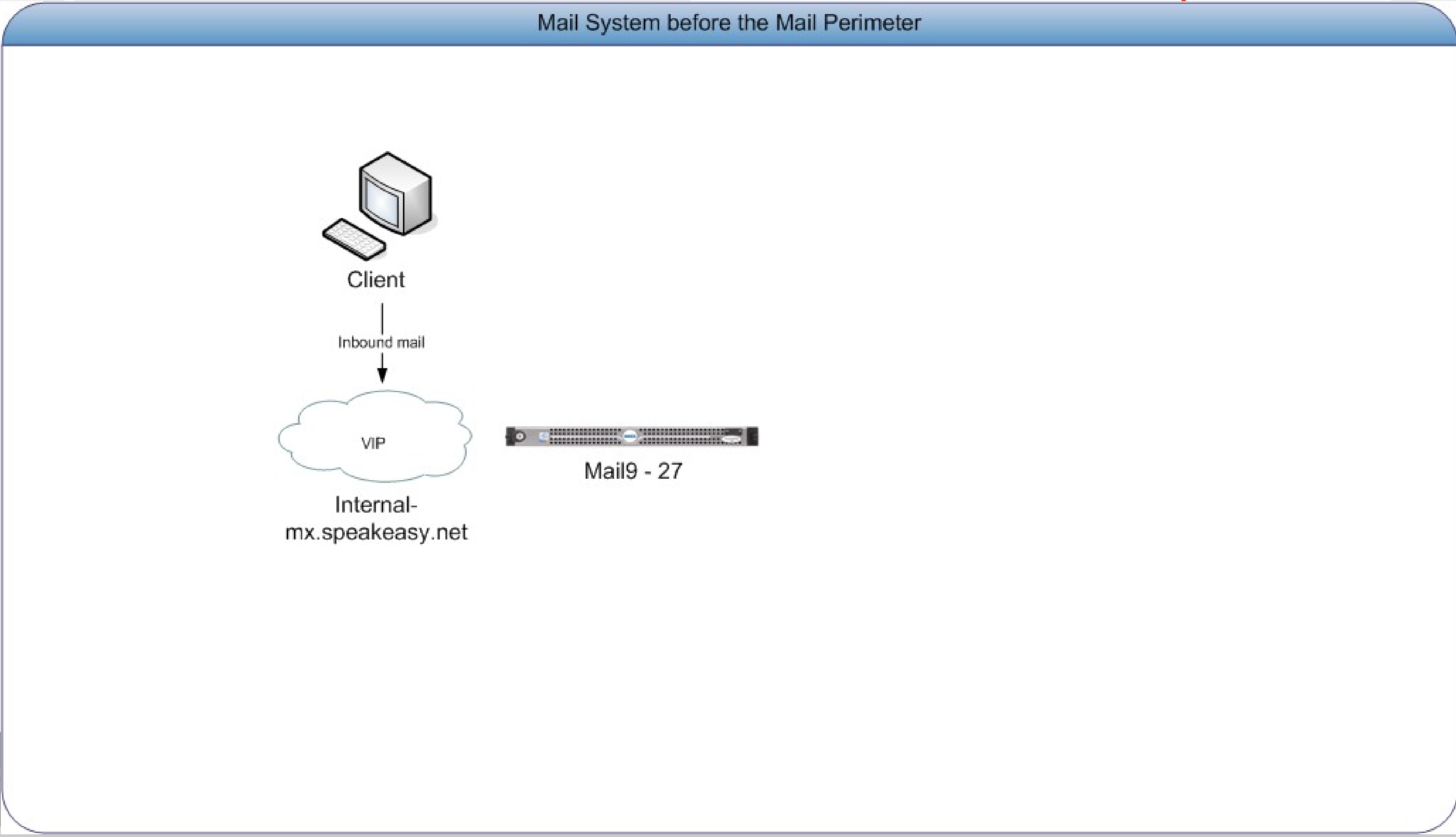
Why move to a tiered system?

Scale out the different pieces that comprise mail as necessary.

Protect mail delivery, which you might not be able to control or change easily.

- qmail cluster
- exchange

The world before the perimeter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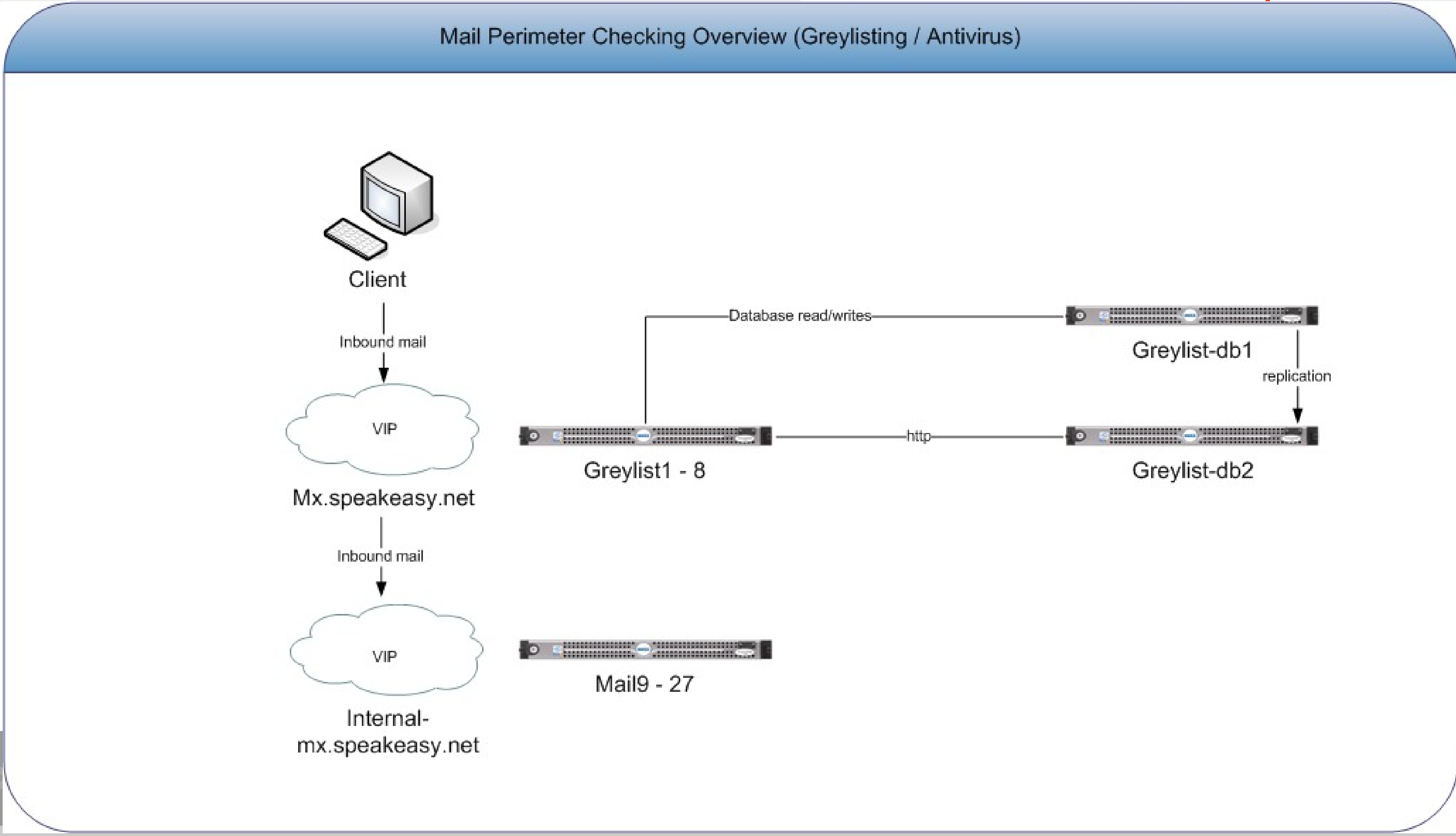
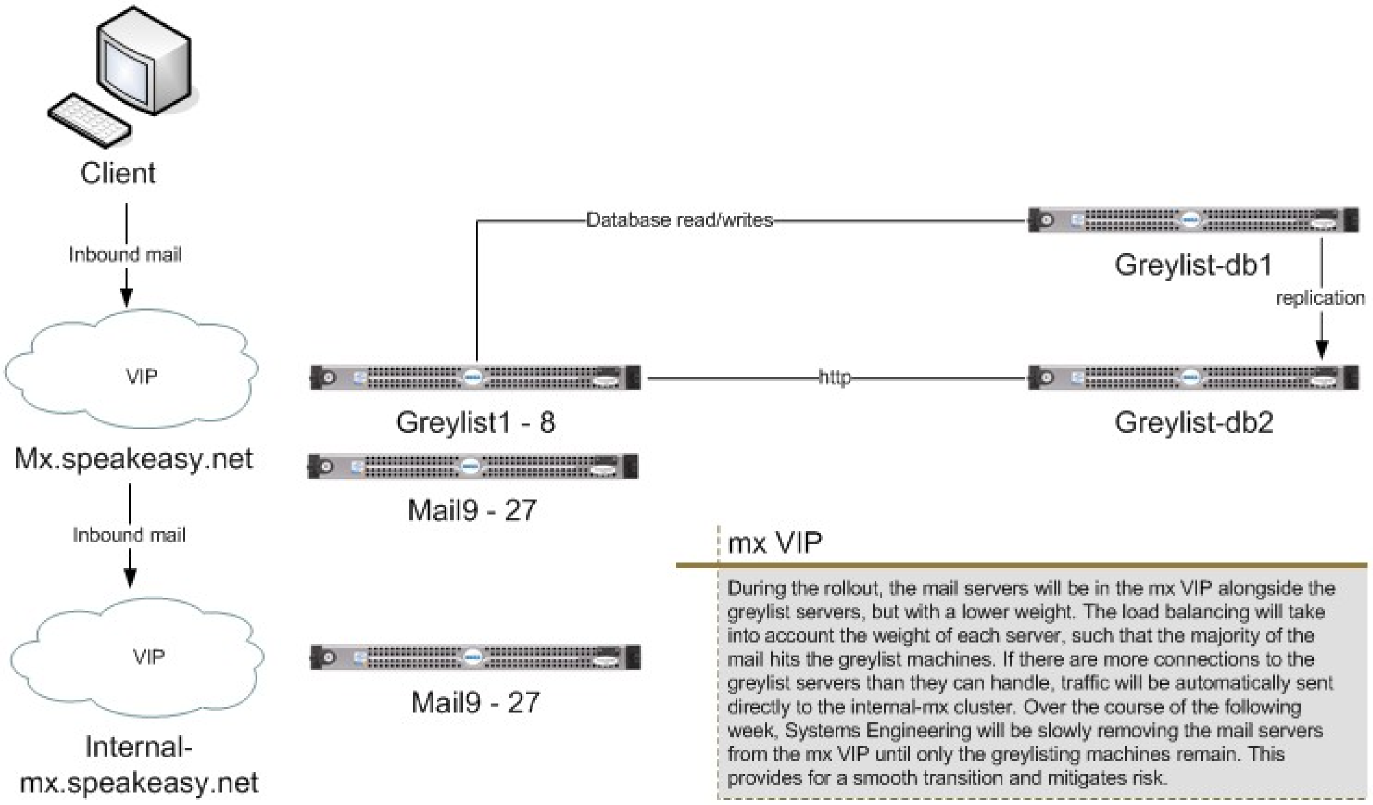
The world with a MX perim



LB Configs

Mail Perimeter Checking (Greylisting / Antivirus) Rollout Overview



mx VIP

During the rollout, the mail servers will be in the mx VIP alongside the greylist servers, but with a lower weight. The load balancing will take into account the weight of each server, such that the majority of the mail hits the greylist machines. If there are more connections to the greylist servers than they can handle, traffic will be automatically sent directly to the internal-mx cluster. Over the course of the following week, Systems Engineering will be slowly removing the mail servers from the mx VIP until only the greylisting machines remain. This provides for a smooth transition and mitigates risk.

The world with a MX perim

Hardware

- 8x perim - 3GHz boxes with HT and 2GB of RAM
- 2x DB - 2x Dual core 2.8GHz boxes with 16GB of RAM
  - Initially less RAM, but upgraded to handle bad greylisting software
  - your mileage may vary here, just be sure to keep the DB happy

Network

- Private gigE network between perim and DB
- Another load balancer between the internet and the perim

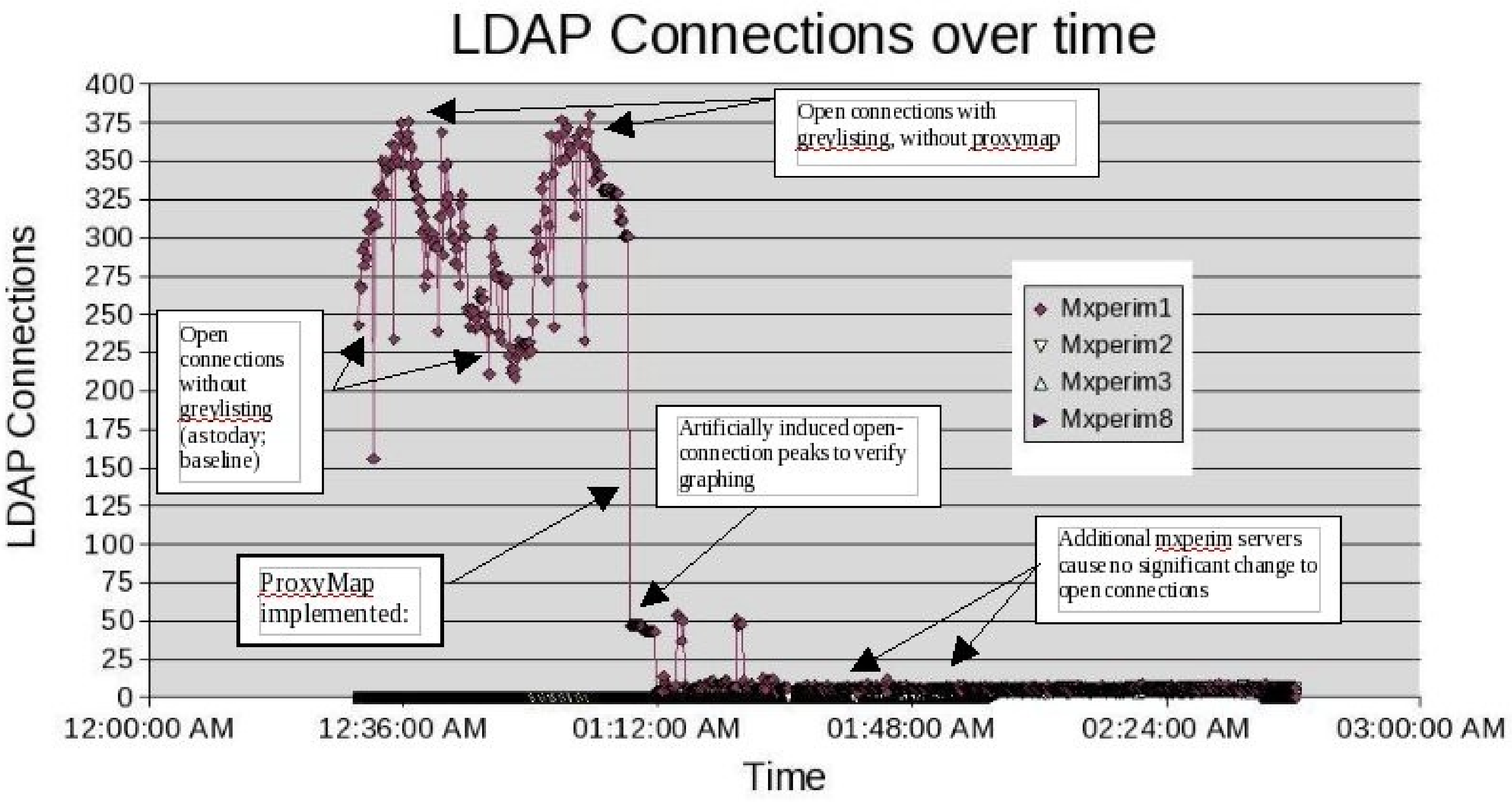
Ensure RFC compliance for role accounts – keep abuse department busy

- Put this line towards the top of **smtpd_recipient_restrictions** in your main.cf
  - check_recipient_access hash:/etc/postfix/roleaccount_exceptions
- roleaccount_exceptions:
  - postmaster@ OK
  - abuse@ OK
  - hostmaster@ OK
  - webmaster@ OK

LDAP recipient check

- Could be file / mysql / etc
- This check is done pre-queue, which gives the sender an immediate failure instead of a message after the fact
- Be sure that your user backend system can keep up, since you are not queuing
- use proxy map – provides read-only table lookup service to all Postfix processes
  - check_recipient_access proxy:ldap:/etc/postfix/ldap-recip-check.cf

Postfix / LDAP integration



Postfix

Bump up default limits

# The maximal number of parallel deliveries to the same destination via the relay message delivery transport. Default is 20.

```
relay_destination_concurrency_limit = 100
```

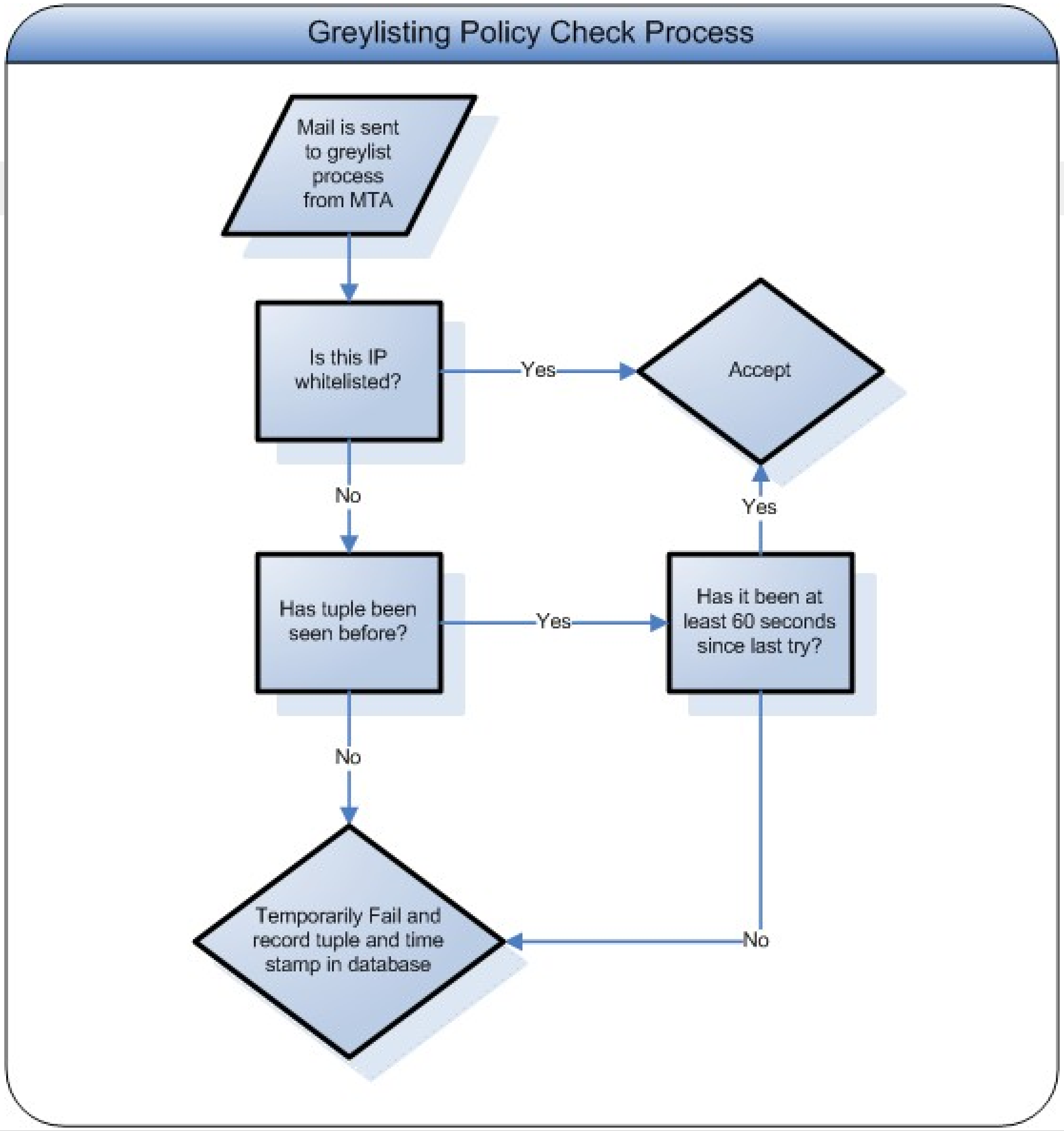
# let more than the default number of daemons run, so we can handle more simultaneous inbound connections

```
default_process_limit = 512
```

Greylisting service written in C

- Why GLD?
  - Inherited it with project – Checking out sqlgrey
- Only two SQL tables, horribly inefficient
- Allows for greylisting a /24 instead of each IP – needed for clusters
- After x successful mails the sender/IP combo is trusted and not greylisted – helps for legitimate bulk mail
- Be sure to check out whitelist on greylist.org and whitelist time sensitive sites, like eBay.
- **check_policy_service inet:127.0.0.1:2525** in your main.cf

GLD


Greylisting Policy Check Process
Mail is sent to greylist process from MTA
Is this IP whitelisted?
Yes
Accept
No
Yes
Has tuple been seen before?
Yes
Has it been at least 60 seconds since last try?
No
Temporarily Fail and record tuple and time stamp in database
No

Performance Tuning

- Upped max connections – this has a direct relation to DB access
- Changed DB to use InnoDB for row level locking
- Changed table to use varchar instead of char
- Tuned the DB's extensively to handle large InnoDB tables
- Used a private gigE network for DB traffic

Results

- 60% of mail greylisted did not come back
- Less mail for the more hardware intensive antivirus checking and spam tagging
- Less mail for the mail delivery system to store

RFC Checking / Antivirus

- amavisd-new does some RFC checking, such as <> around addresses
- amavisd-new calls clamav **pre-queue**
  - This allows for quick response and avoids backscatter at the expense of having fast antivirus machines that can keep up with the mail load
- postfix's master.cf
  - # use a proxy_filter instead of a content filter so that the mail does not have to be queued

```
smtp      inet  n       -       -       -       -       smtpd
    -o smtpd_proxy_filter=localhost:10024
    -o smtp_data_done_timeout=1200
```

amavisd-new / ClamAV

Performance Tuning

- Bump up simultaneous servers

$max_servers = 16; # default is 2

- Each amavisd process is using about 20MB of memory
- One clamav process that uses about 300MB of memory
- Shared memory mount for /var/lib/amavis
  - cuts way down on disk IO.
  - Ours is 400MB, make sure that yours is large enough or amavis with barf on you and cause a cascade effect

amavisd-new / ClamAV

- First line is important to scan entire message and catch phishing

```
@keep_decoded_original_maps = (new_RE(
qr'^MAIL$',   # retain full original message for virus checking (can be slow)
qr'^MAIL-UNDECIPHERABLE$', # recheck full mail if it contains undecipherables
qr'^(ASCII(?! cpio)|text|uuencoded|xxencoded|binhex)'i,
));
```

DNS queries

Mail lookups generate a lot of DNS traffic

- We have caching DNS servers on the DB servers
  - each perim box points to these machines over the private network
  - you could run a caching dns server on each perim box if memory allows

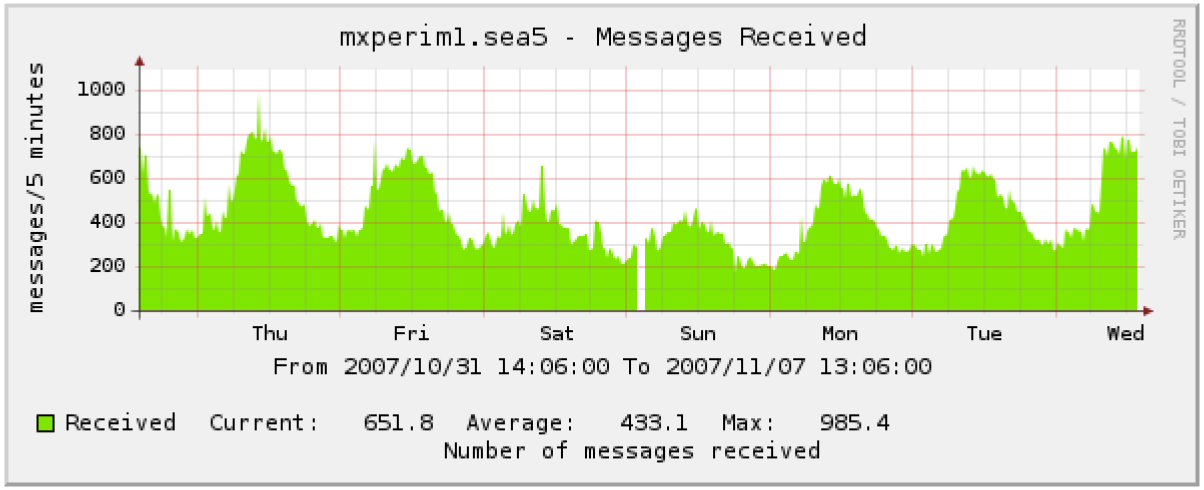
Graphs are good

Keep stats

- We use cacti to graph stats from the mail servers
- Messages received, SMTP connections, viruses found, queue size, and more
- Graphs are not only informative, they also aid in troubleshooting

Graphs are good

Cacti graphs



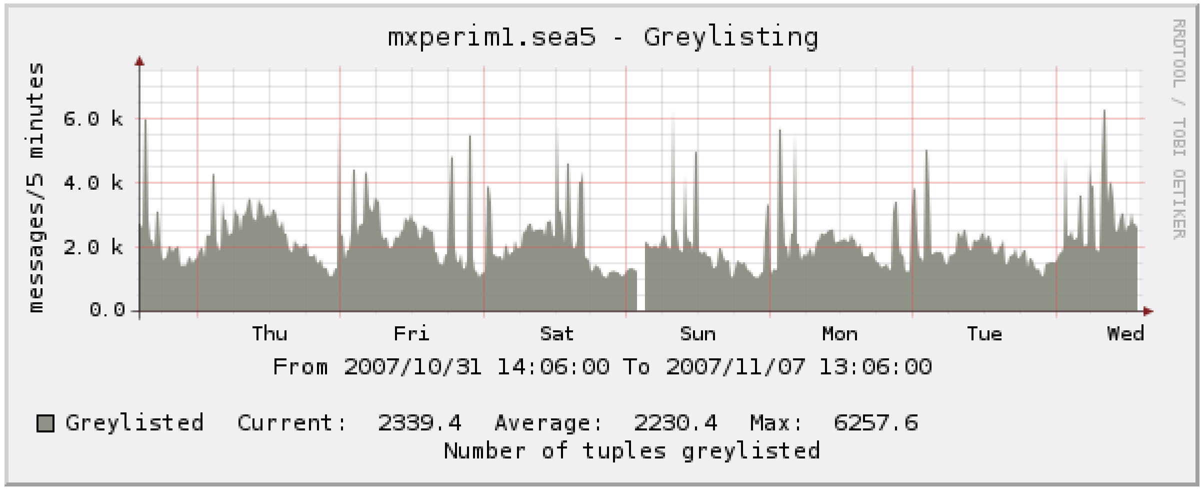
From 2007/10/31 14:06:00 To 2007/11/07 13:06:00

🟩 Received Current: 651.8 Average: 433.1 Max: 985.4
Number of messages received

Messages received over a week period

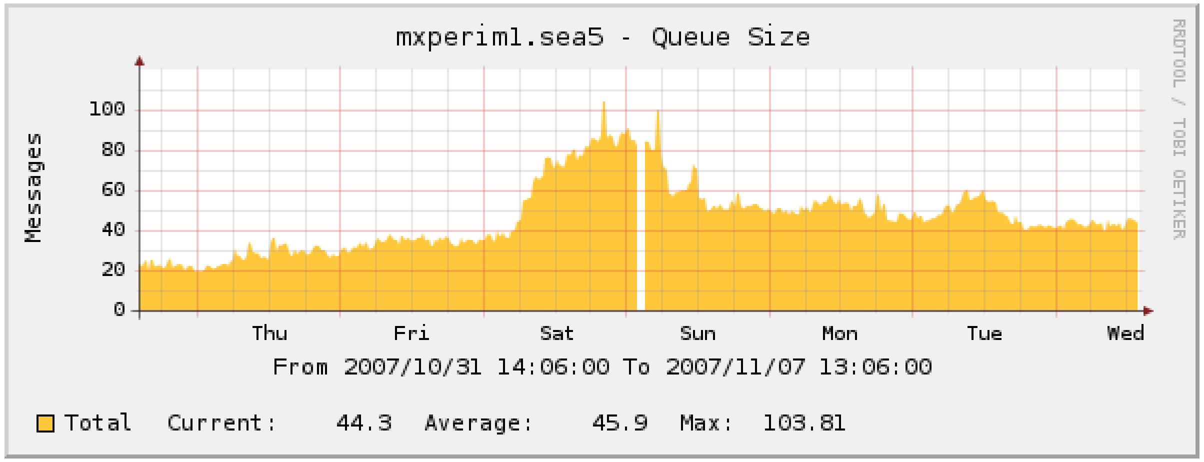
Graphs are good

Cacti graphs



Messages greylisted over a week period

Cacti graphs



Queue size over a week period

Load Testing

Load test before putting service into production

- Step 1: determine the load of the current system
- Step 2: attempt to simulate current load on new system
- Step 3: analyze test results to validate that new system can handle the load

Postfix includes handy mail load testing tools

- We used smtp-source and smtp-sink included with Postfix
- smtp-source generates mail, smtp-sink listens on port 25 and shoves messages to /dev/null
- We used 2 load generation boxes and 3 sink boxes. Scale this as appropriate

Using smtp-source/sink

- Start the sink:

```
# smtp-sink -c mailsink1:25 10000
```

- Start the source:

```
# smtp-source -c -m -l 512 -m 1000 -s 10 localhost:25
```

start 10 threads each sending 1000 512 byte messages to localhost:25

It's important to load test all system parts

- Load test all moving parts
- Mail servers, database servers, load balancers, LDAP, DNS queries
- You don't want any surprises in production!